

REMARKS

Claims 15-34 are pending and active in the above-identified application. The pending claims are rejected under 35 U.S.C. § 103(a) over primary reference U.S. Patent No. 6,132,587 to Jorne et al. in combination with a plurality of secondary references. For clarity purposes, applicants set forth a table below, listing how the various combinations of the primary Jorne et al. reference and the plurality of secondary references are applied against the pending claims.

Claims	Primary Reference	Secondary References
15 and 20	Jorne et al. (6,132,587)	Inoue et al. (5,556,814); Erb (6,107,186); Taylor et al. (6,203,684); Reid et al. (6,074,544); Shue et al. (6,140,241); and Lowenheim text, <i>Electroplating</i> . . .
16-19 and 32-34	Jorne et al. (6,132,587)	Inoue et al. (5,556,814); Erb (6,107,186); Taylor et al. (6,203,684); Reid et al. (6,074,544); Shue et al. (6,140,241); Lowenheim text, <i>Electroplating</i> . . . ; Ting et al. (6,077,412); and Young et al. (4,705,606)
21-26	Jorne et al. (6,132,587)	Inoue et al. (5,556,814); Erb (6,107,186); Taylor et al. (6,203,684); Reid et al. (6,074,544); Shue et al. (6,140,241); Lowenheim text, <i>Electroplating</i> . . . ; Abys (4,427,502); and Dubin et al. (5,972,192)

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Claims	Primary Reference	Secondary References
27-31	Jorne et al. (6,132,587)	Inoue et al. (5,556,814); Erb (6,107,186); Taylor et al. (6,203,684); Reid et al. (6,074,544); Shue et al. (6,140,241); Lowenheim text, <i>Electroplating</i> . . . ; and Dubin et al. (5,972,192)

The specification has been amended above to recite that the present application is a continuation-in-part of prior copending Application No. 09/880,715, filed June 12, 2001, which in turn is a continuation of U.S. Patent Application No. 09/018,783, filed February 4, 1998. In addition, the specification has been amended to recite that the present application is also a continuation-in-part of U.S. Patent Application No. 08/988,333, filed September 30, 1997, which is now U.S. Patent No. 5,985,126. Application No. 09/880,715 and Application No. 09/018,783 name L.W. Graham as an inventor, who is also an inventor of the subject application. U.S. Patent No. 5,985,126 also names L.W. Graham as an inventor.

Each of the parent applications 09/880,715, 09/018,783, and U.S. Patent No. 5,985,126, claims a filing date prior to the filing dates of the Jorne et al., Reid et al., Shue et al., and Ting et al. references. The parent applications disclose subject matter commensurate in scope with the teachings of Jorne et al., Reid et al., Shue et al., and Ting et al. The disclosures of the parent applications establish that the applicants were in possession of the subject matter relied upon in the cited references and, therefore, the noted references are not properly citable.

For the Examiner's convenience, applicants set forth below those passages of the earlier filed parent applications that disclose the subject matter for which the primary reference Jorne et al., and the secondary references Reid et al., Shue et al., and Ting et al. are cited.

As detailed at page 2 of the Examiner's Action, Jorne et al. is relied upon for disclosing a process for electroplating a metal, such as copper, onto a semiconductor wafer. According to the Examiner's Action, Figure 1 of Jorne et al. shows that wafer 1 is held face down opposite anode 2 and brought into contact with an electroplating solution, which is circulated to an electroplating chamber by pump 26. Power is applied to the wafer by contacts 9. In addition,

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Jorne et al. is cited for teaching electroplating into submicron features and the provision of a metal seed layer no more than 1,000 angstroms thick.

Application No. 09/880,715, which claims a filing date six months prior to Jorne et al., describes each of the features for which Jorne et al. is cited. Specifically, page 8 through page 10 discloses electroplating copper onto a semiconductor wafer. Page 8 through page 10 also discloses maintaining the wafer in a face-down orientation. Page 8 through page 10 also discloses that electroplating power is applied to the workpiece through a series of electrical contacts. Page 12, lines 7-9, discloses a metal seed layer that is less than 1,000 angstroms thick, and page 17, line 13, discloses electroplating into submicron features. In view of the above teachings in the parent Application No. 09/880,715, and the February 4, 1998 filing date of parent Application No. 09/880,715, Jorne et al. is not properly citable against the present application and, therefore, the outstanding rejections based on Jorne et al. must be withdrawn.

In addition, applicants assert that the secondary references Reid et al., Shue et al., and Ting et al. are not properly citable against the present application in view of the filing dates and the disclosures of the parent applications.

Reid et al. is cited for disclosing that nonuniform deposition resulting from a "terminal effect" may be overcome by first plating with a relatively low current and then increasing the current to improve the plating rate. Shue et al. is cited for the same reason as Reid et al., namely, electrochemical deposition of copper in two stages, wherein the first stage employs a low current density and a second stage wherein a high current density is employed.

Application No. 09/880,715, at page 16, lines 1-10, describes a low current initiation subprocess, wherein low plating current is provided between an anode and a wafer, followed by a high current plating subprocess, wherein a higher plating current is provided for electroplating operations, is described. In view of the teaching in parent application No. 09/880,715 of the features relied upon in Reid et al. and Shue et al., and the February 4, 1998 filing date of parent application No. 09/880,715, applicants assert that Reid et al. and Shue et al. are not properly citable against the present application.

The patent to Ting et al. is cited for disclosing that wafers can be washed and dried prior to contacting with an electrolyte. In addition, Ting et al. is cited for disclosing that a wafer can be spun to rinse and dry the wafer and that deionized water may be used.

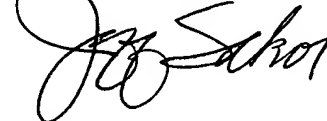
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The disclosure of parent application No. 08/988,333, which matured into U.S. Patent No. 5,985,126, at Column 15, line 64 through Column 16, line 5, describes spinning a semiconductor wafer to distribute process fluid across the face of the wafer or to aid in drying after a wet chemistry process. In view of the teaching in U.S. Patent No. 5,985,126 of the features relied upon in Ting et al., and its filing date of September 30, 1997, applicants assert that Ting et al. is not properly citable against the present application.

For the foregoing reasons, the reliance upon Jorne et al., Reid et al., Shue et al., and Ting et al. in rejecting Claims 15 - 34 is improper and applicants respectfully request withdrawal of the outstanding rejections of Claims 15-34 and allowance of the application. If the reviewing party has any questions regarding the foregoing, he is invited to call applicants' attorney at the number listed below.

Respectfully submitted,

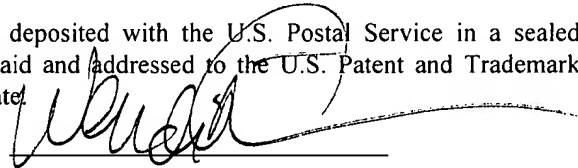
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MARKED-UP VERSION AS OF AUGUST 21, 2002

In the Specification:

A new section entitled "Cross-Reference to Related Applications" has been introduced immediately after the title on page 1.

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